

APEX Summary



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Outline

- ❖ APEX stats
- ❖ Experiments in Run-6 (fast glance, more complete review at APEX Workshop)
- ❖ Organizational issues (in general and in response to remarks from Bill, Kevin, etc.)
- ❖ Preparation for Run-7, contribution to ERTAF



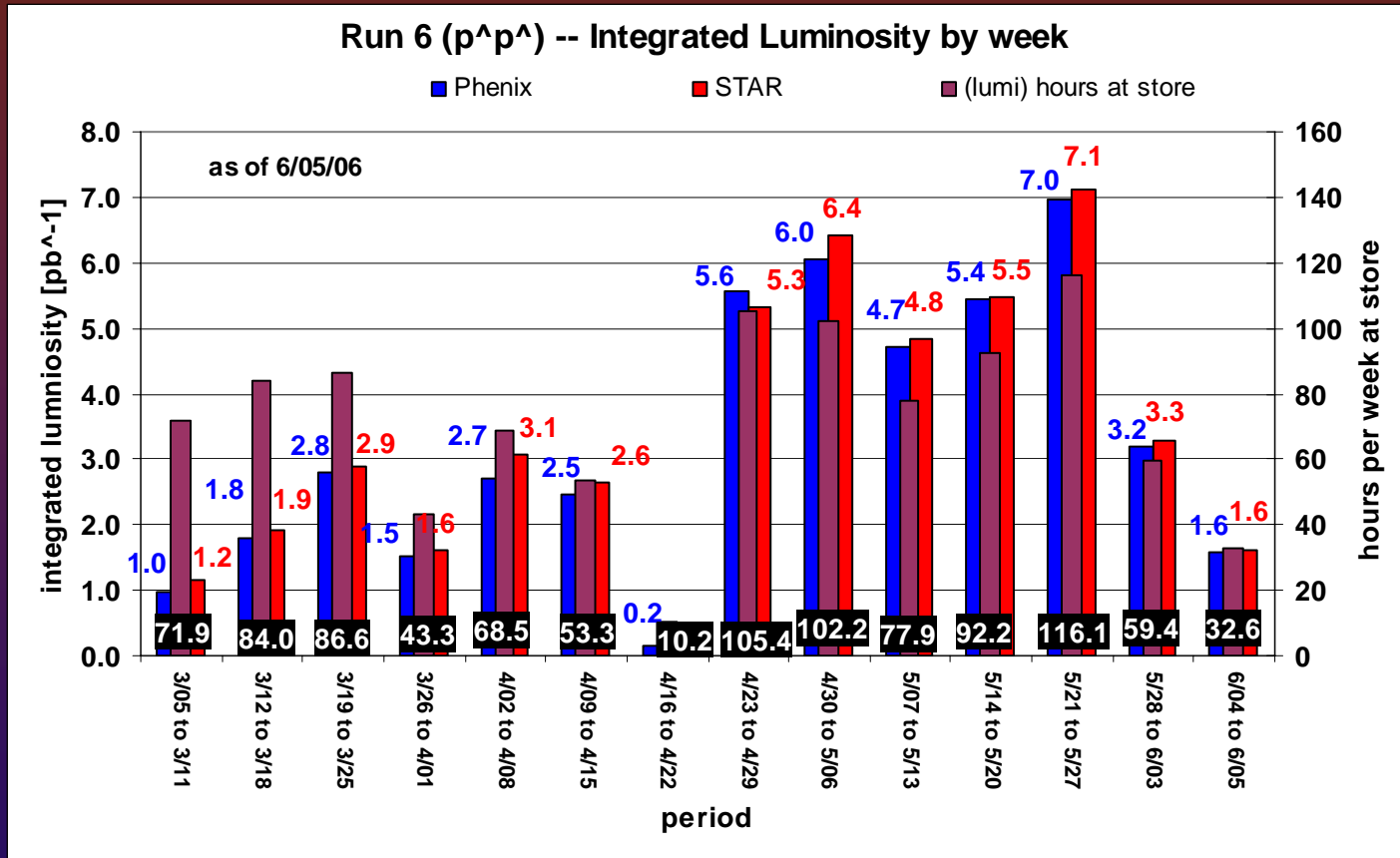
APEX goals, recall

GOALS

- ❖ Improve machine **performance** (longer time scale than 'now' machine performance) - Class1
→ 2-3 years time-scale (**ERTAF**)
- ❖ RHIC **upgrades** (RHIC-II, eRHIC)
- ❖ Development of **beam diagnostics** techniques
- ❖ Inter-lab **collaborations**
- ❖ **Class 2** experiments – general accelerator physics or for other projects (strictly none so far, although we should discuss status of some of LARP related exp if not clearly in the interest of RHIC)



Physics at 200 GeV



For accounting purposes: take 13 weeks
(policy for low energy runs should be clarified, later)



APEX statistics

Run-5 Cu: **9** (7 HE + 2 LE) physics weeks

Run-5 PP: **10** physics weeks

Run	Max Time agreed	Time scheduled	Beam time (failures <6 min ignored)
Run-5 Cu-Cu	108	92	70
Run-5 P-P	120	99	88
Run-6 PP	152	139	120

	Run-3 d-Au	Run-4 Au-Au	Run-5 Cu-Cu + PP	Run-6 PP
scheduled/planned	80 %	90 %	84 %	90%
beam/scheduled	65 %	84%	83 %	86%



APEX Run-6 - 1

Studies focused on BPMs

- ❖ **Beam-based alignment** (Niedziela, Satogata)
full data set taken, analysis in progress
→ *talk by Jen yesterday*
- ❖ **Orbit response matrix** (Satogata)
full data set taken, analysis in progress
- ❖ **Auto-trigger vs. fixed trigger** (Michnoff)
tests



APEX Run-6 - 2

Operations related

- ❖ Beam-based **sextupole polarity check** (Luo)
worked well, checked all sextupoles
- ❖ **Optics measurements with AC dipole** (Bai)
worked well, measured betas at all IP's
→ *Talk by Mei today*
- ❖ Comparison **rotator settings with model** (MacKay)
verification of rotator model
- ❖ **Rotators at injection** (MacKay)
established possibility of ramping rotators to $\sim 1/2$ current at injection if needed



APEX Run-6 - 3

Nonlinear dynamics

- ❖ Measured **2nd order chromaticity** (Tepikian et al)
yellow>blue → relevant for sextupole plans
- ❖ Measured **skew chromaticity** (Tepikian et. al.)
- ❖ **2/3 resonance measurement and correction at injection** (Bengtsson, Luo et al)
use driving terms, proved difficult so far
→ *Talk by Yun yesterday*
- ❖ **Operational 2/3 resonance correction** (Calaga, et al)
look at beam decay directly – worked in yellow but not consistently



APEX Run-6 - 4

Instrumentation and developments

- ❖ Calibration tune, emittance and chromaticity measurements (Cameron, Connolly, Brown, etc.)
- ❖ RF phase modulation chromaticity measurement and calibration (Cameron et al) – *did not work well*
- ❖ BTF and BBTF measurements with BBQ (Cameron)
→ operational now, application
- ❖ PS balancing (Cameron, Schultheiss)
controversial, not settled yet



APEX Run-6 - 5

- ❖ **PS ripple** (Brown with Schottky, Cameron with BBQ)
effort started with LF Schottky
with BBQ measured an effect at the 10^{-4} level,
considerably larger than expected
- ❖ **Stochastic cooling** preparation (Brennan,
Blaskiewicz)
kicker alignment, etc. → *continued in operations*
- ❖ **10 Hz orbit feedback** (Montag)
continuing in development, talk by Christoph



APEX Run-6 - 6

Beam-beam

- ❖ **Long range beam-beam** (Fischer et al)

goal: establish feasibility of long range beam-beam measurements for compensation (LARP) – not trivial to measure

→ *Talk by Wolfram*

- ❖ **Beam-beam, only 1 IP** (Montag et al)

relevant for operations and eRHIC plans

repeated, consistent dependence of beam lifetime with intensity of incoming beam



APEX Run-6 - 7

SPIN studies

- ❖ **Snake resonances** (Bai et al)

Completed, study of snake resonances in blue and yellow.
Interesting results.

- ❖ **Spin tune measurements** (Bai et al)

attempted a few times because of technical glitches
measurement done

- ❖ **Polarization vs. source** polarization (Huang, Zelenski)

- ❖ **Spin decoherence** (MacKay)

experiment unfortunately rescheduled (beam was down for 4
hour) → next year



APEX Run-6 - 8

High intensity studies (Zhang Huang)

E-cloud, emittance

→ *Talk by SY*



Organizational issues

❖ Policy

existing: on APEX web page

specify: special runs, back-2-physics

maintain flexibility also necessary

❖ Review and prioritization criteria (AEAC)

❖ “end-game” chronology

❖ Scheduling

❖ Preparation

❖ Results



AP Experiment Categories

Class:

- 0:** likely to immediately benefit RHIC machine performance, or crucial to RHIC hardware decision making
- 1:** directly benefiting RHIC machine performance
- 2:** benefiting general accelerator community

Priority:

- A:** a) benefiting RHIC operation; b) well prepared; and c) likely to succeed
- B:** has at least two of the above
- C:** has at least one of the above
- D:** has none of the above

NEED TO STREAMLINE THIS → AEAC Committee

Peer review: in place

- ❖ APEX Experiments Workshop
- ❖ APEX Weekly Meeting



APEX and run "end-game"

- ❖ Phil Meeting, Tuesday 5/23
 - hours needed to complete program
 - 27 h at store
 - 21 h at injection
- ❖ AEAC, Friday 5/26 → priorities for scheduling
- ❖ APEX session May 30-31 (18 h store)
- ❖ APEX session June 13-14 (18 h injection)



Scheduling

❖ Shorter APEX sessions

NOT in favor: planning more difficult, micro-scheduling more difficult (rearranging APEX schedule because of failures, etc.)

❖ Weekly periodicity

no reason to change IMHO
scheduling meeting, APEX meeting



Preparation, Results

- ❖ Some studies (minority) were not sufficiently prepared → need to avoid this in the future
in a few instances, outcome never reported at the APEX Meeting
- ❖ Results
Need to collect formally results and publications from APEX (formal request from Sam during the run)
→ timescale of the APEX Workshop this (late) summer



Prep for Run-7

- ❖ APEX Workshop 2007
end of September 2006 ?
- ❖ Coordinate APEX with ERTAF activity
- ❖ AEAC Committee → revisit criteria